the Atom

Los Alamos Scientific Laboratory

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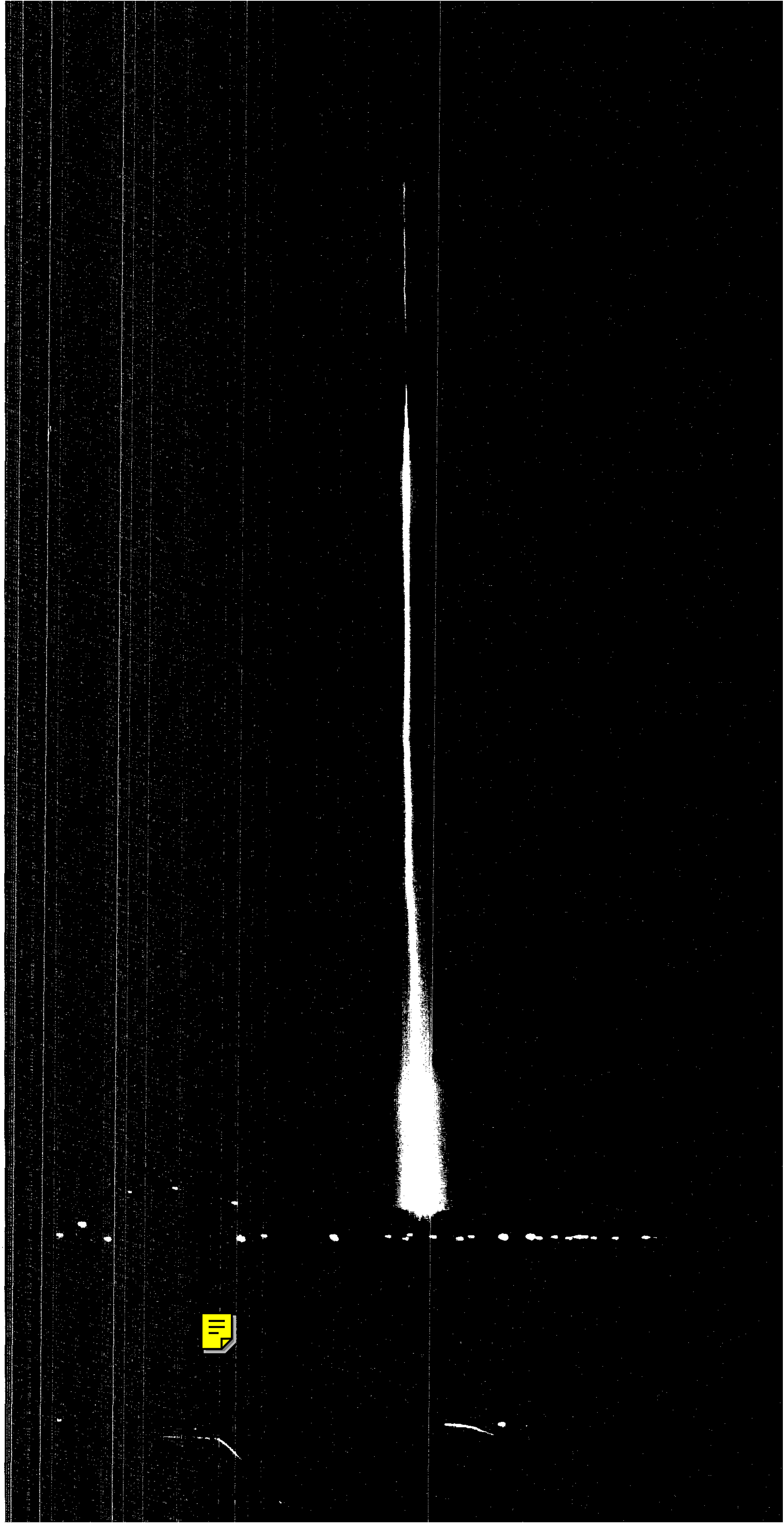

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In this Issue

Regular Features

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FRONT COVER

The first of 2 rockets in the Operation Lagopedo ionospheric probe experiments lifts off the Hawaiian island of Kauai on September 1. Johnnie Martinez of ISD-1 was there. Read his story and see more photos of the experiment beginning on Page 1.

Operation Lagopedo

Poised for flight, the Terrier-Sandhawk rockets and their scientific payloads were a sight not many of the LASL experimenters had an opportunity to see. By the time the rockets were uncovered and carefully pointed heavenward by Sandia Laboratories personnel, the LASL researchers were generally busy making last-minute preparations for their experiments.

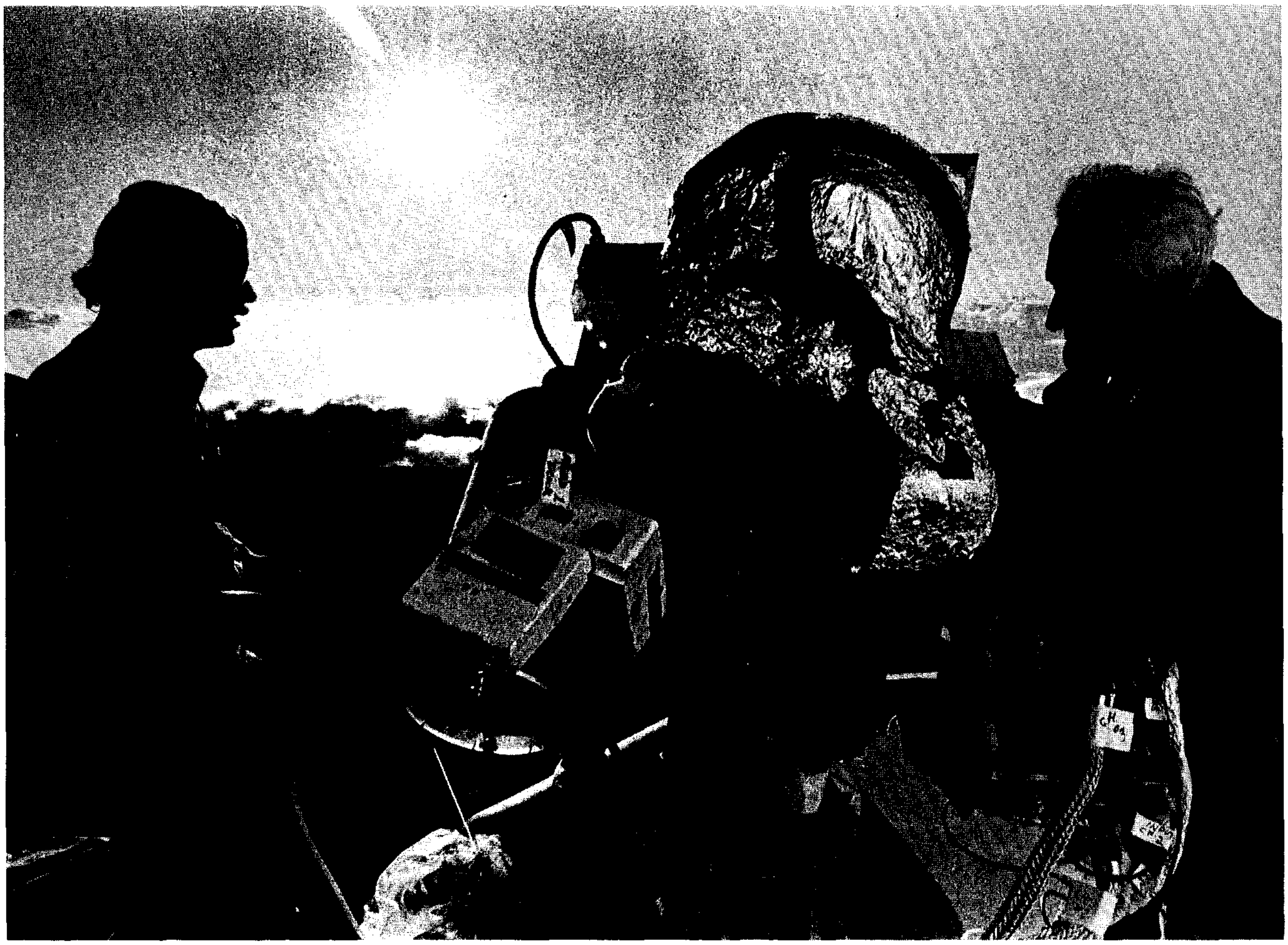
Ionospheric Experiments Successful

By JOHNNIE MARTINEZ

The Hawaiian sky had turned black and the humid air along the Pacific Missile Range had cooled a little. All was quiet in the early evening darkness of September 1 except for the hushed noises of a small cluster of people who peered expectantly at a group of red lights a mile or so away.

The metallic voice of a computer nicknamed Hans would periodically startle the little group into silence as it rasped out the minutes and seconds to launch time for LASL's Operation Lagopedo.

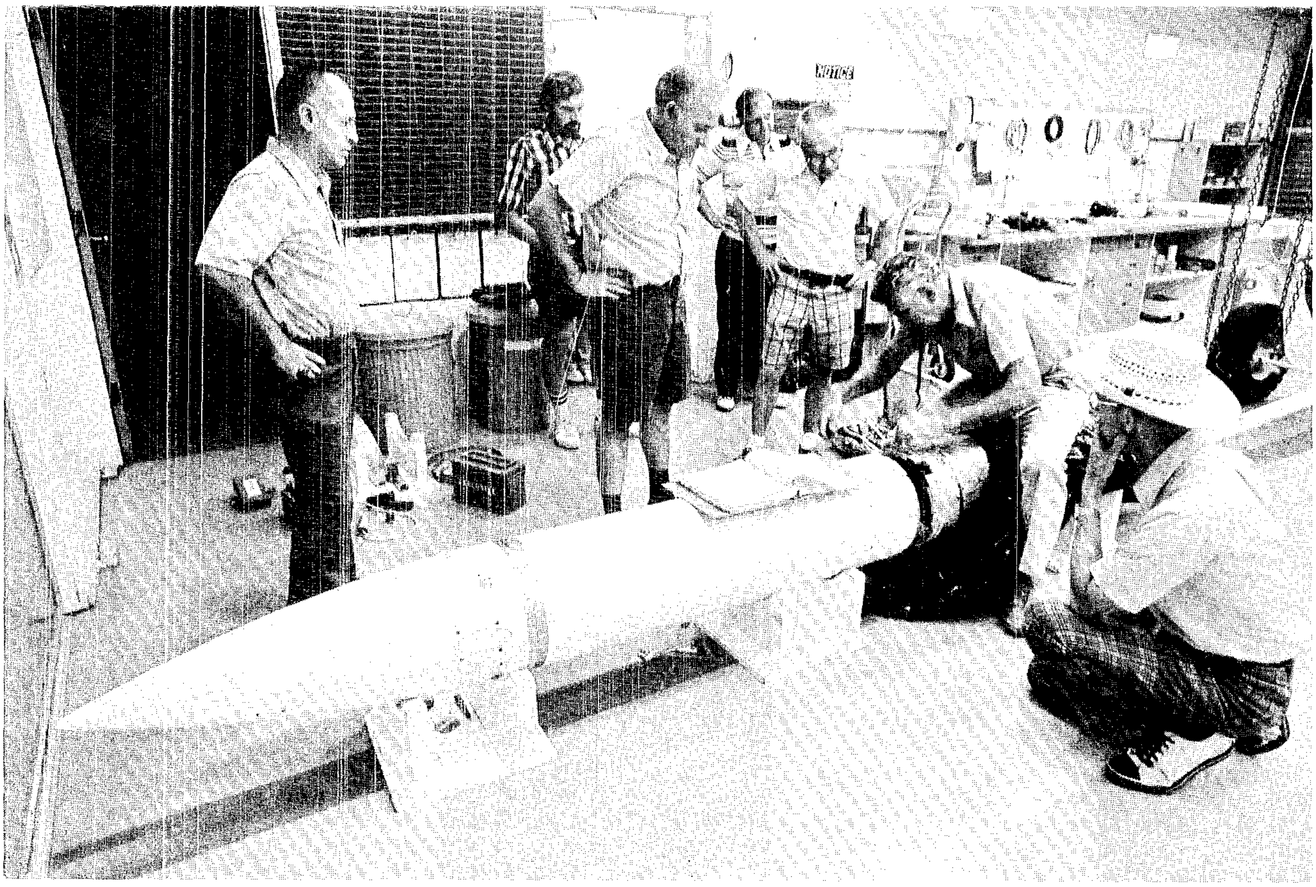
Suddenly an area hidden in the trees behind the red lights of the missile range lit up as a fiery rocket hurled itself heavenward, with a scream so intense it took the breath away. Long after the rocket's screams had died away and the spectators had resumed breathing, necks continued to bend upward and eyes focused on a point in space more than 260 kilometers above. There, with an almost surprising lack of noise, a dim light seemed to flicker for a moment and then spread slowly until it became a circular, luminous cloud. It was "event time" for Operation Lagopedo.



The many cameras located at the Mauai observation station required special handling and preparation each evening as event time neared. Charles Gow, J-9, left, and Casimir Stevens, J-10, were among the many Lagopedo experimenters who found themselves carefully making adjustments to and checking the performance of their complicated pieces of equipment.

The little crowd of onlookers cheered in the dark while cameras and radio receivers throughout the island chain began their vigil with silent, methodical intensity.

Minutes after the glowing cloud of light had vanished from the ionosphere and the cameras had ceased their quiet activities, a group of enthusiastic researchers



Assembling a rocket containing a complicated experiment like Lagopedo called for a great deal of skill. The job was ably handled by members of the Sandia Laboratories team headed by Ted Krein, shown here straddling the rocket. Sandia Laboratories also operates the Kauai Test Facility from where the 2 probes were launched. The painstaking assembly work in Hawaii was preceeded by lengthy engineering sessions in which the various pieces of equipment needed by the experimenters and the performance characteristics of the rocket and its flight were carefully worked out.

from LASL's atmospheric sciences and optical physics group (J-10) and their Sandia Laboratories colleagues broke into smiles, shook hands, and repeated to each other the news—Lagopedo Uno was a success!

Lagopedo Dos, the second of J-10's 2 ionospheric depletion experiments, conducted on September 11, was also a success. And with the experiment's completion, a sizeable addition has been made to man's accumulating knowledge of the chemical processes that take place in the ionosphere as a result of both natural causes and man-made disturbances of varying degrees.

Operation Lagopedo (Spanish for the northern grouse or ptarmigan) was the latest of a series of rocket probes that have been conducted by LASL from launch sites as varied as Hawaii and the chilling interior of the Arctic Circle. Lagopedo was specifically designed to modify the chemistry that naturally occurs within an active region of the upper atmosphere known as the F-layer of the ionosphere.

The F-layer is itself an important part of the atmosphere, with properties that affect such important areas as communications and weather. For Lagopedo, the F-layer served as a unique laboratory where certain chemical reactions could be studied under known conditions. The data gathered, when analyzed, will be compared to the predictions of elaborate computer codes constructed by John Zinn and Dexter Sutherland, both J-10, to model such chemical changes. The comparison of experimental results with these computer models is required routinely as the models are used to describe more complex problems, such as the effects of released fluorocarbons and the emission from supersonic aircraft.

Operation Lagodedo was planned so that known quantities of water, carbon dioxide, and nitrogen would be released into the evening air. The 3 materials occur in abundance lower in the atmosphere but were taken to an altitude of about 285 kilometers by means of Terrier-Sandhawk rockets and released by the detonation of a high-explosive charge within the payload.

Optical observation stations were based near Sandia's Kauai Test Facility on the Hawaiian Island of Kauai and on Mt. Haleakala, an extinct volcano on Maui. Radio receivers were stationed on Kauai near the rocket launch site, on Oahu near the Department of Energy operations building at Hickam Air Force Base, on the Island of Hawaii, and on French Frigate Shoals to the northwest of Hawaii.

The whole procedure might sound somewhat simple, but a scientific expedition like Lagopedo doesn't begin with the arrival of men and equipment in Hawaii. Months and, in some cases, years of preparation and theoretical calculations are necessary to give the experimenters an accurate idea of what methods and tools they can best use to seek the answers to their questions. Because the number of people and amount of equipment that can be taken along on a project such as Lagopedo is always limited, a considerable amount of time must be spent at home rehearsing the performance of the technical team and equipment before the expensive rocket shots.

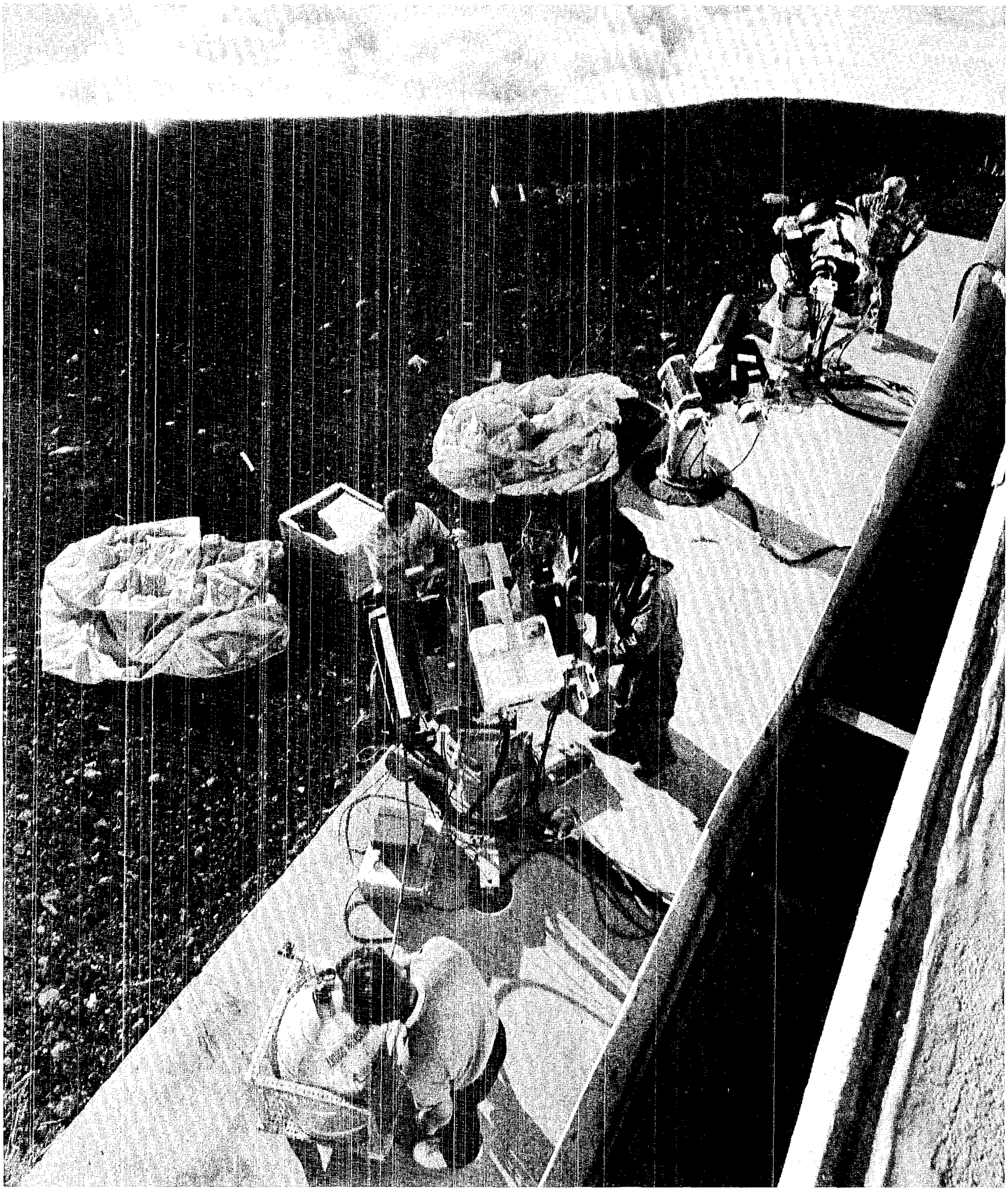
A multitude of safety and procedural questions must be considered before the expedition ever sets foot on the missile range. In the case of Operation Lagopedo, the safety of the explosive payload was further enhanced with the development of a fiberglass-type container that would be shredded into patches of cloth—not chunks of metal—during detonation. Work on this problem earlier in the year found a group of J-10'ers, Sandia Laboratories rocket experts, LASL M-Division (Dynamic Testing), and WX-Division (Design Engineering) explosives personnel at the Ancho Canyon facilities detonating payload models and combing the area for traces of shrapnel.

Another sizeable portion of the preliminary work required by Operation Lagopedo took place at the Sandia Laboratories in Albuquerque. Sandia personnel were responsible for the rocket payload fabrication and launching portions of the test. This responsibility translated itself into many hours of engineering effort in which the various pieces of equipment needed to conduct and monitor the probe were carefully placed to create a balanced scientific payload able to withstand the extreme stresses of rocket flight.

Engineering the payload and other components necessary for the launching of the 2 Lagopedo probes proved to be quite a task for Ted Krein, the Sandia payload engineer, because of the number and complexity of some of the experiments flown.

Both Lagopedo experiments involved scientific payloads weighing 200 kilograms. The high-explosive portion, a mixture of nitromethane and ammonium nitrate, was contained in a separate, detachable portion of the payload and was designed, when detonated, to create and release the water, carbon dioxide, and nitrogen. The remaining portion of the payloads contained 4 experiments whose performance, along with the ground-

Morris Pongratz (standing) and Gordon Smith, both J-10, served as co-directors of Operation Lagopedo. On the shoulders of these 2 men and scientific advisor Robert Jeffries (then J-10 Group Leader) rested the ultimate responsibility for either launching a rocket or postponing the experiment for another day. The tendency of the F-layer ionosphere to move about and change density made the job a difficult one for the experimenters, whose plan was to release the experiment in the center of a dense, thick F-layer.



Despite the cold, LASL's observation station on Maui proved to be one of the most beautifully located of Operation Lagopedo's facilities. The station was at the summit of Mt. Haleakala, an extinct volcano, and provided a spectacular view of the Pacific and several neighboring islands. This scene shows the approach of sunset—a busy time at the station as Mel Duran and his crew readied themselves and their equipment for the nighttime rocket probes.

based experiments, were vital to the overall evaluation of the release.

The 4 rocket-borne experiments included a thermal-ion detector sponsored by the National Research Council of Canada, an ion mass spectrometer operated by the Naval Research Laboratory, a Langmuir probe from the University of Texas at Dallas, and a dual-frequency beacon transmitter flown by the Stanford University Electronics Laboratory.

The thermal-ion detector measured changes in ion content and direction of flow as a result of the detonation, while the Naval Research Laboratory measured the density of ions with various masses in the vicinity of the injection. Measurements of electron concentration and temperature were made by the Langmuir probe and electron column densities were measured by the Stanford transmitter.

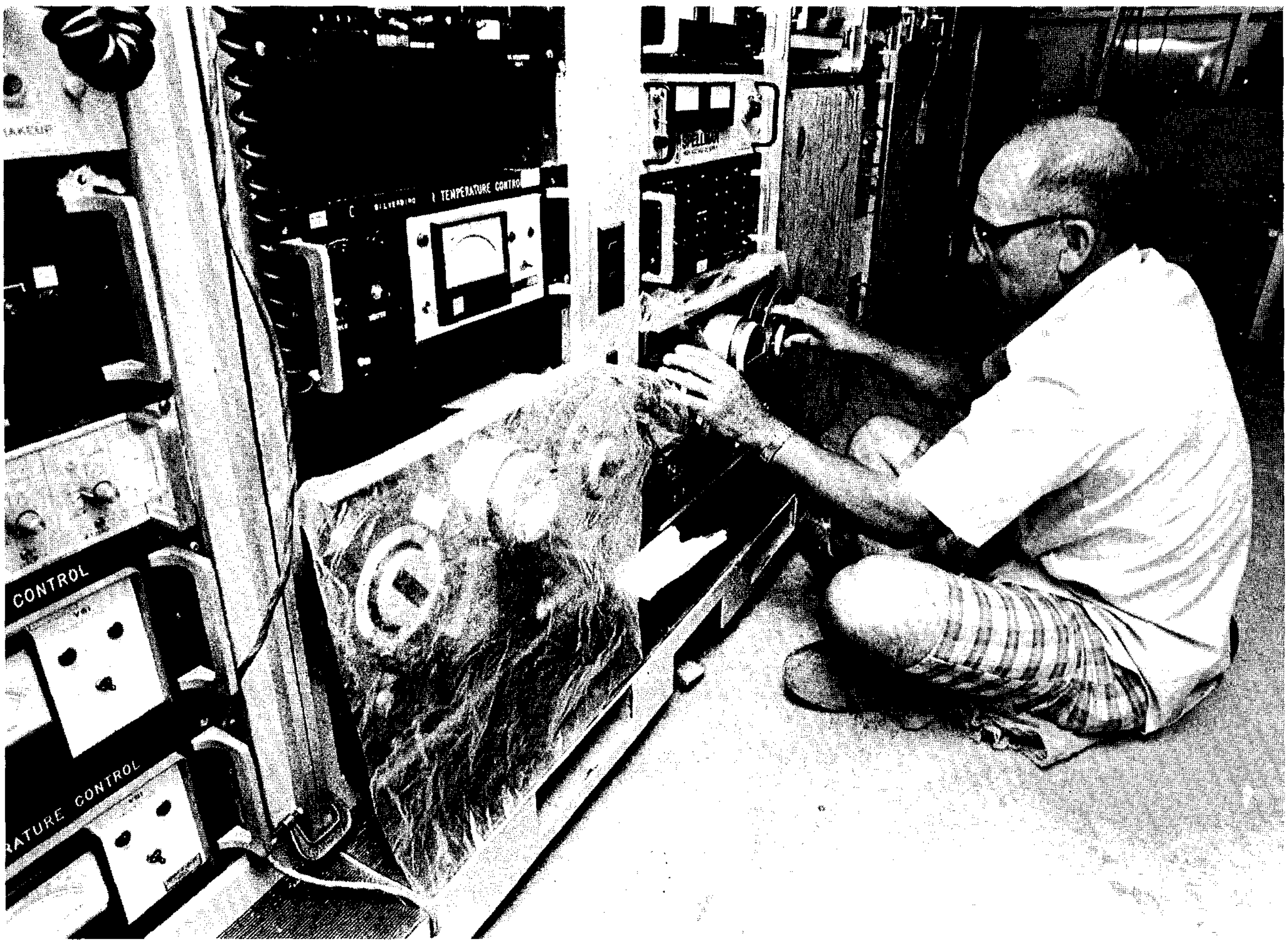
That portion of the payload containing the scientific instruments was spring-separated from the high explosive package after rocket-motor burnout, but before detonation, and passed through the release volume seconds after the event. Signals from the insruments were radioed back to earth and monitored by receivers located on Kauai and Oahu.

In addition to these airborne experiments, several experiments were conducted from various places at ground level. These experiments included high-frequency-radar measurements of small-scale electron density gradients near the detonation and multi-frequency sounding of the ionosphere, which revealed a detailed description of the ever-moving F-layer.

The high-frequency-radar measurements were made from the island of Hawaii by the Stanford Research Institute. The ionospheric sounder, a state-of-the-art machine called a Dynasonde, was operated by the National Oceanic and Atmospheric Administration to monitor the electron density, stability, and altitude of the F-layer—information that critically affected the decision to launch the rocket.

Far to the northwest of the Ha-

Rocket shots are exciting events, and Operation Lagopedo's 2 probes were thrilling to watch, but it isn't all glamour as Ruben Martinez, J-10, could wearily tell you. Ruben and other members of the Kauai Observation station led by John Wolcott, J-10, found much of their time consumed by the seemingly endless demands of the various pieces of recording and control equipment that were taken to Hawaii to monitor Lagopedo's release.



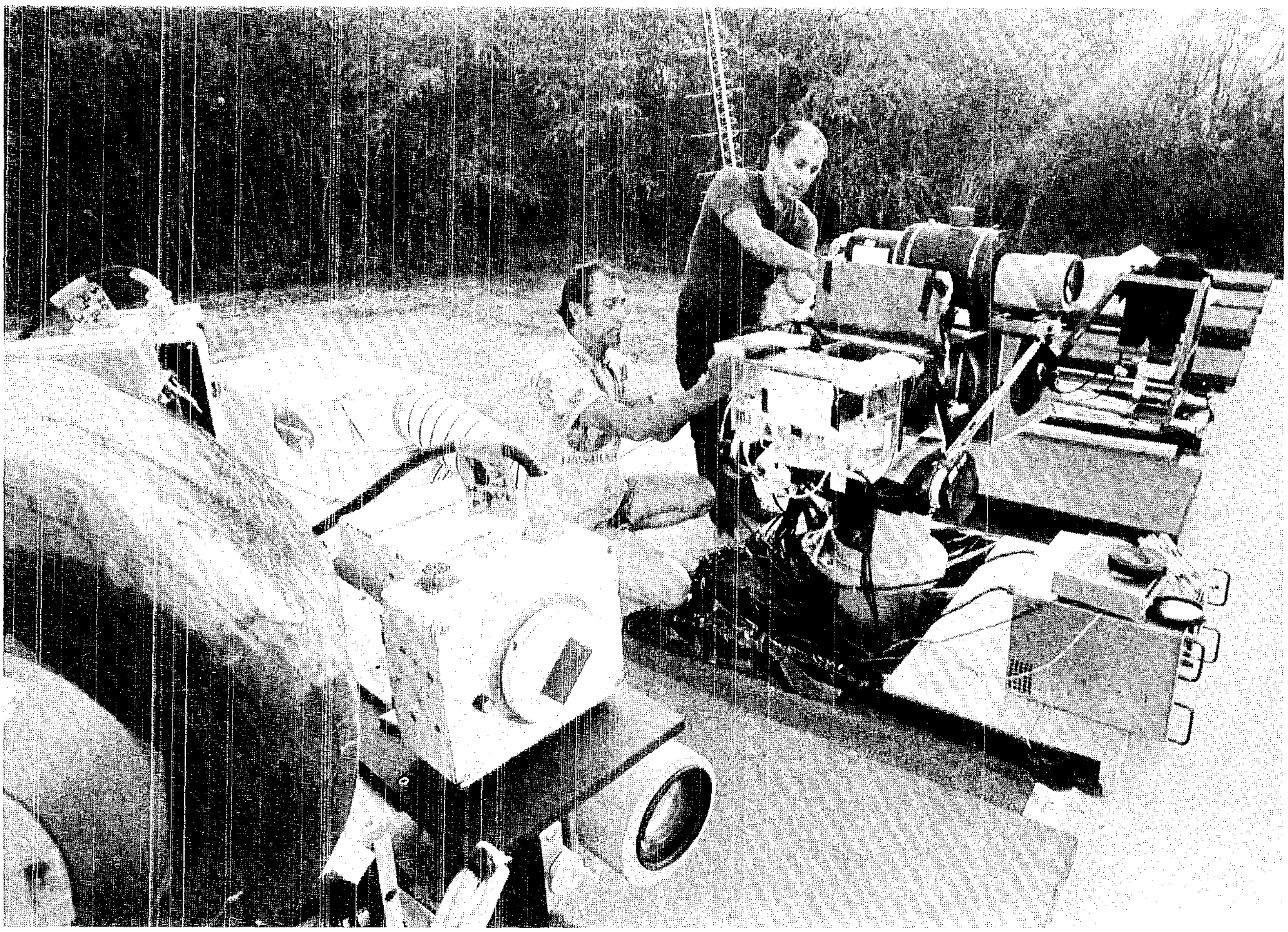
waiian Islands, on a small body of land known as French Frigate Shoals, the University of Texas at Austin located receivers designed to measure the chemical activities of the release using radio signals originating from satellite transmitters.

John Wolcott, J-10, headed the crew at the Kauai "Barnyard" optical station, while Mel Duran, J-10, and his optical experimenters put on parkas for the chilling, nighttime temperatures of Mt. Haleakala. These primary observation stations featured a variety of instrumentation designed to record on video tape and photographic film the emissions produced by the release. The various exposure sequences, lens filters, film types, and aiming mechanisms were all part of the involved choreography that functioned properly.

The 2 rocket missions were launched from Sandia Laboratories' Kauai Test Facility where Al Huters served as Sandia Test Director. It was here that Morris Pongratz and Gordon Smith, both J-10,

Helping To Unlock Secrets Of The Atmosphere

The "Barnyard" at the Kauai Test Facility was home for one of LASL's 2 main observation stations. J-10'ers Ken Green (left) and Bobby Borrego were among the crew who spent long hours in the damp heat each night as the rocket probes were readied for the experiment. Green and Borrego are shown here with some of the special cameras mounted on top of an equipment shack located approximately one-half mile away from the rocket launcher.



co-directed the scientific aspects of the experiments. Assistant J-Division Leader Robert Jeffries, then J-10 Group leader, functioned as scientific advisor, and C. R. Robertson, J-DO, served as LASL operations officer.

An instable F-layer postponed launching of Lagopedo Uno for one day until the evening of September 1. The launch of Lagopedo Dos was a little more trying as weather problems forced a delay of the launch almost a week.

Both ventures into the ionosphere were successful and, although there were the usual minor problems encountered, Operation Lagopedo has done its part in proving that man can now begin to predict the responses of the atmosphere to chemical inputs—predictions necessary if society is to continue its technological advances in safety.

Communications, Pollution Assessment, Weather Prediction Gained From The Experiment

Afternoon operational meetings for Lagopedo experimenters on Kauai were punctuated with progress reports, appeals for help, suggestions, and occasional flashes of humor. During these meetings, the experimenters were also kept informed of the multitude of operational and weather situations that would combine to create either a successful launch or another day's wait.

What might technically be called the first of the Lagopedo detonations didn't occur over Hawaii at all. An experimental payload containing approximately 100 kilograms of explosives was detonated at LASL's Ancho Canyon facilities to test the safety of the experiment. The payload's container had been made of a fiber-glass-type material designed to shred itself into bits of cloth—not hard chunks of shrapnel.

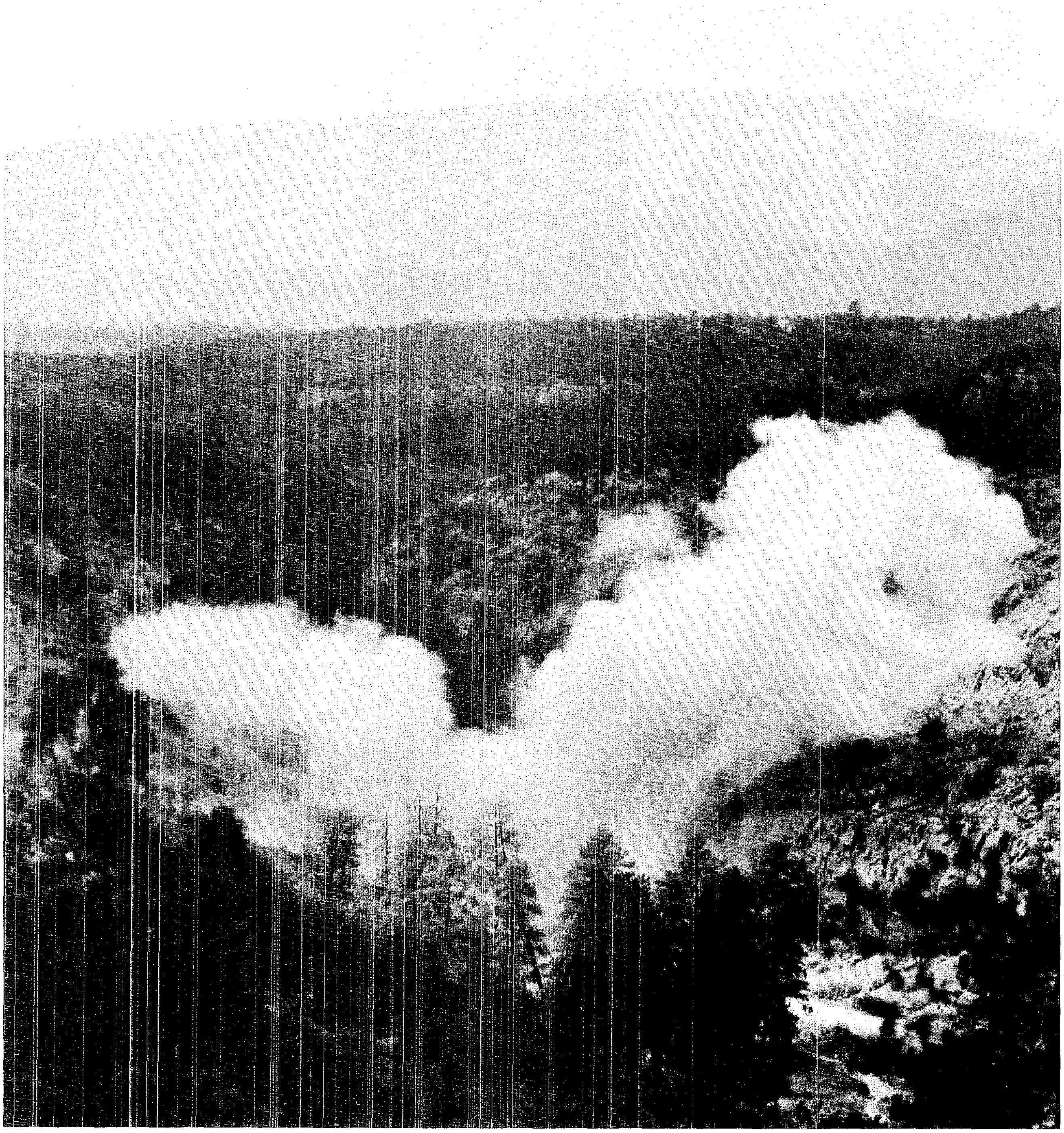
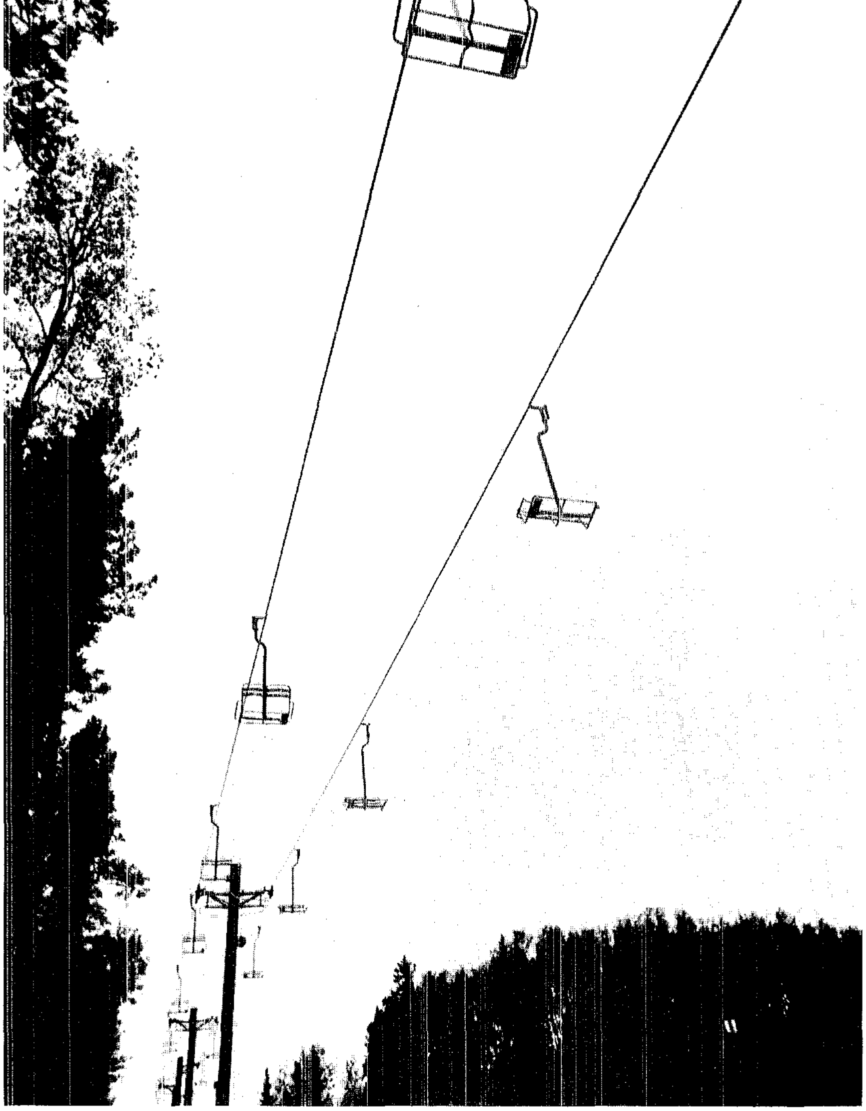
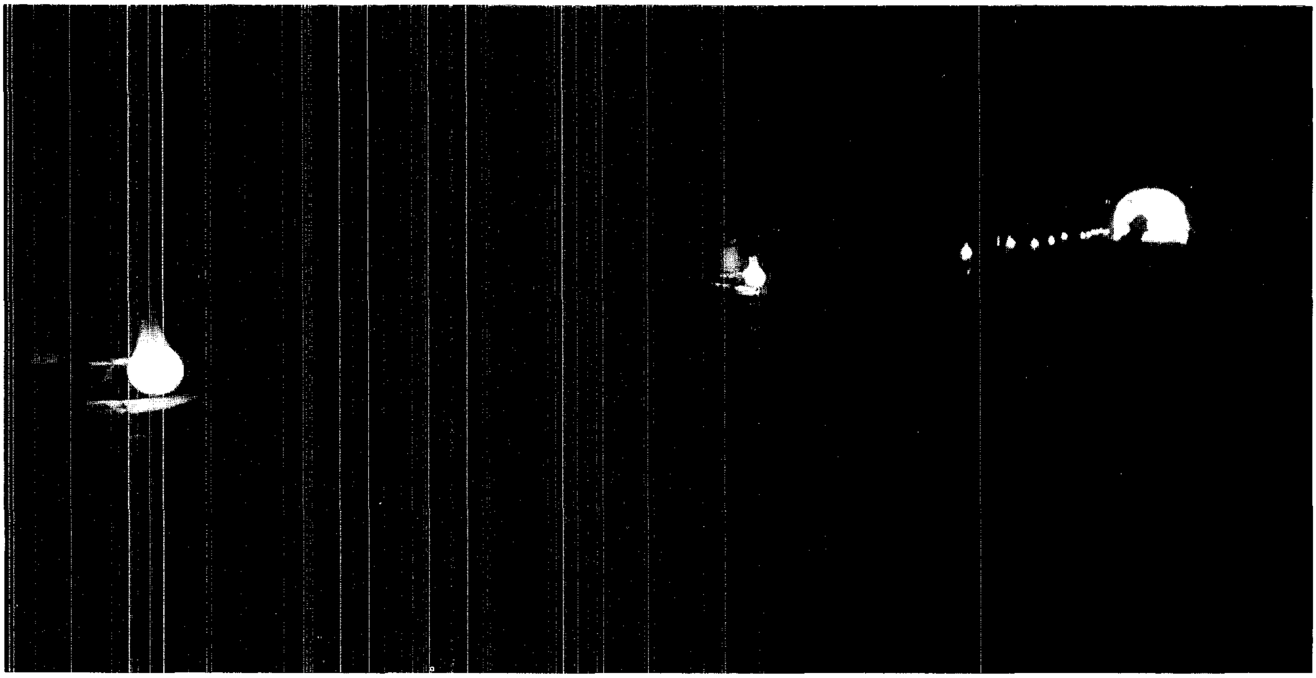


Photo Shorts



There is no business yet for this ski lift, but it won't be long before the chairs are packed with skiers on their way to the slopes of the ski basin in the Jemez Mountains near LASL.

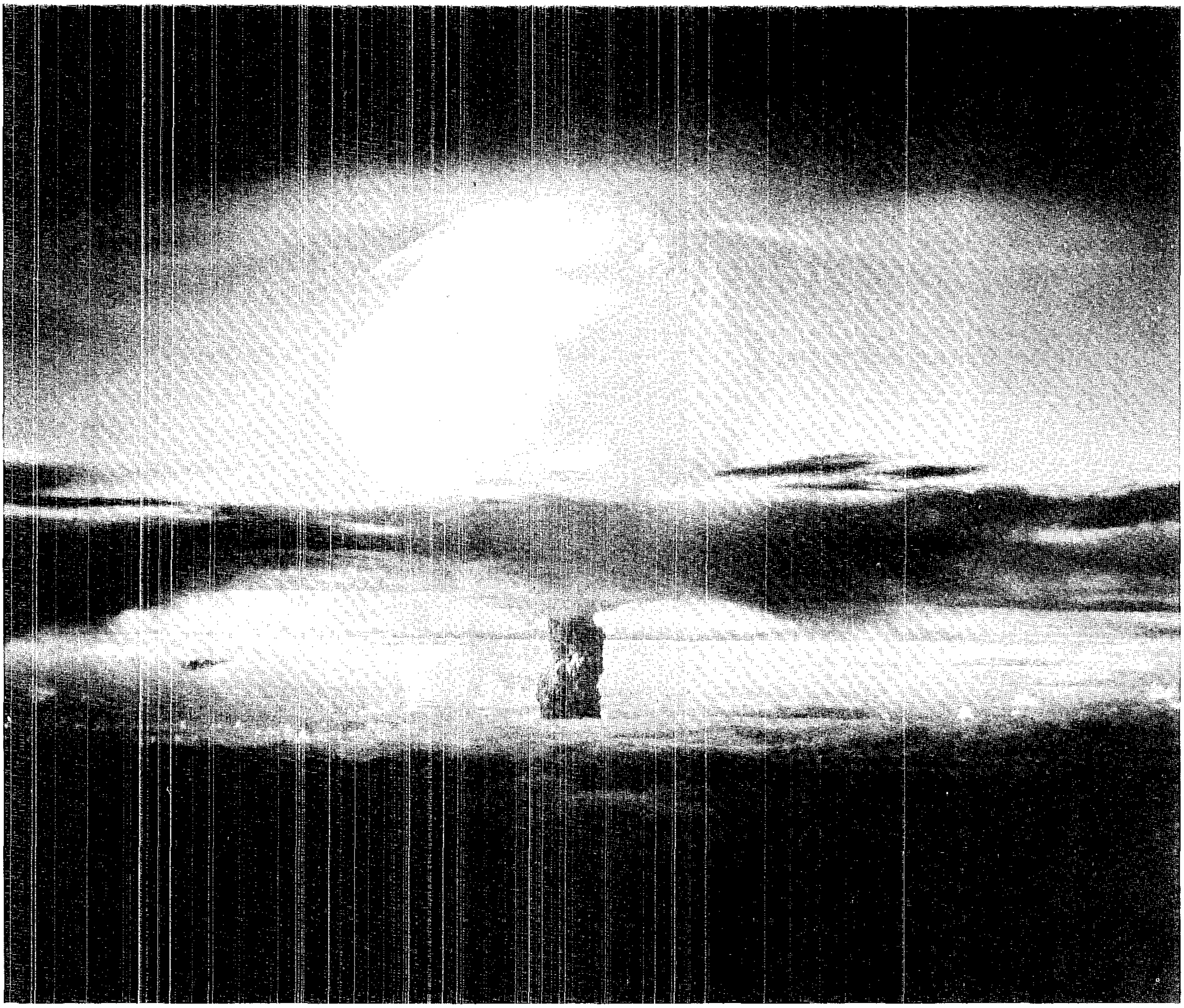
A string of light bulbs point the way to the light at the end of the tunnel (a tunnel at the Nevada Test Site), a welcome sight after being far underground.



The 25th Anniversary Of

Mike Shot

Twenty-five years ago, on October 31, 1952, the world's first experimental hydrogen thermonuclear device was detonated on the surface of the small Pacific island of Eniwetok. The shot, named Mike, was particularly significant in that elements 99 and 100 were discovered as a result of the blast. The cloud top rose to about 100,000 feet. Many LASL people, some still working for the Laboratory, were involved in the theory, design, and assembly of the Mike device.



NTS Is An Education

By BARB MULKIN

Before U. S. astronauts accomplished their historic moon landing they tested their Lunar Excursion Modules (LEMs) in a remote pockmarked area of the Nevada desert. The terrain was remarkably suitable for such a test, closely resembling the barren surface of the moon, save for the tumbleweeds, greasewood, and phalanxes of Joshua trees seen resting on their interminable trek across the arid landscape.

The men and vehicles would have travelled north and west of Las Vegas, over a highway called "the widow maker" to the city of Mercury in Nye County.

Today, the widow maker has been tamed with federal and state dollars to a smooth, 4-lane highway rolling 65 miles from the glitter of Las Vegas to the entrance of the other-world atmosphere of the Nevada Test Site.

Air-conditioned buses and innumerable private autos daily commute from Pahrump, Indian Springs, and Las Vegas to NTS. And, several times each year, buses transport the spouses and dependents of NTS employees on special tours of the nation's on-continent proving ground for weapons development testing.

Such a day was October 3, when relatives of LASL employees were treated to a glimpse of selected areas of the vast site during a daylong tour conducted by Bob Beiler, LASL's J-3 group leader.

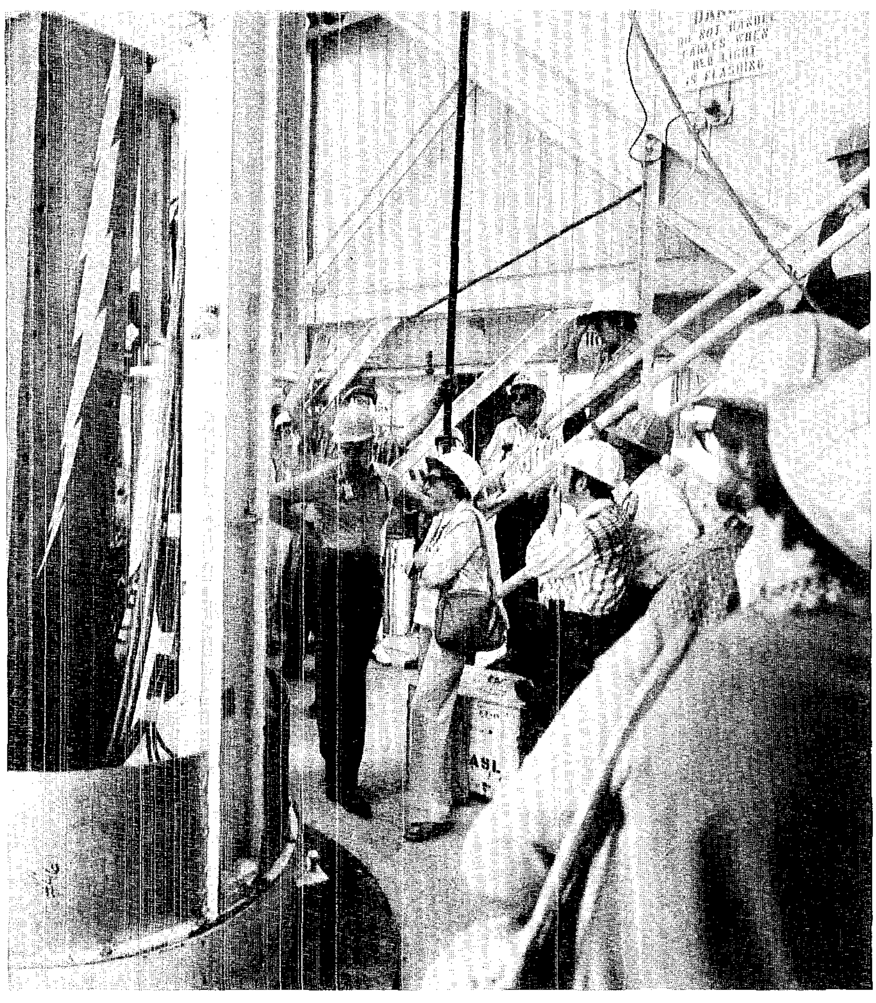
Badged and a little diffident, the group boarded the bus in the parking lot in front of the Las Vegas Strip's El Morocco Motel at 7:15 a.m. Beiler took the mike, competing manfully, as he welcomed the visitors aboard, with a mile or more of billboards advertising Charo en Fiesta, Liberace, Loose Slots, and 40-cent Keno Games down the world-famous heart of the nation's fun city.

Once clear of Las Vegas, Beiler and Jeanie Bowman of the J-Division Office served coffee. The tourists, all U.S. citizens and over 18, settled back to learn about the site they were to visit as the bus rolled smoothly through wind-sculpted mesas and low, erosion-honed mountains.

In the post World War II years, nuclear weapons tests were held in the Pacific, where safety considerations for man and his environment were a tradeoff against the extensive logistics support and vast expense of the tests. By 1947, the need for a continental site to supplement the Pacific proving ground was becoming evident. Such a need became a necessity by 1950, when weapons development was accelerated during this country's Korean involvement.

The Nevada Test Site was chosen from a long list of possible locations and carved from the Air Force's Las Vegas Bombing and Gunnery Range (now the Tactical Fighter Weapons Center Range Complex).

A uniquely appropriate choice, the site satisfied the necessary criteria: low population density, good weather conditions, government-owned land, accessible labor and supplies, and security.



In the photo at left, visitors to NTS are briefed in the main control room, and in the photo at right they learn about the rack that carries experiments and diagnostic equipment, as well as a nuclear explosive device, deep into the ground under the Nevada desert floor.

NTS was created in December, 1950. The first nuclear test took place there on January 25, 1951. Since 1962, all of the weapons tests at the site have taken place underground in accord with the terms of the Limited Test Ban Treaty formally signed in Moscow on August 5, 1963.

A briefing was given at Mercury:

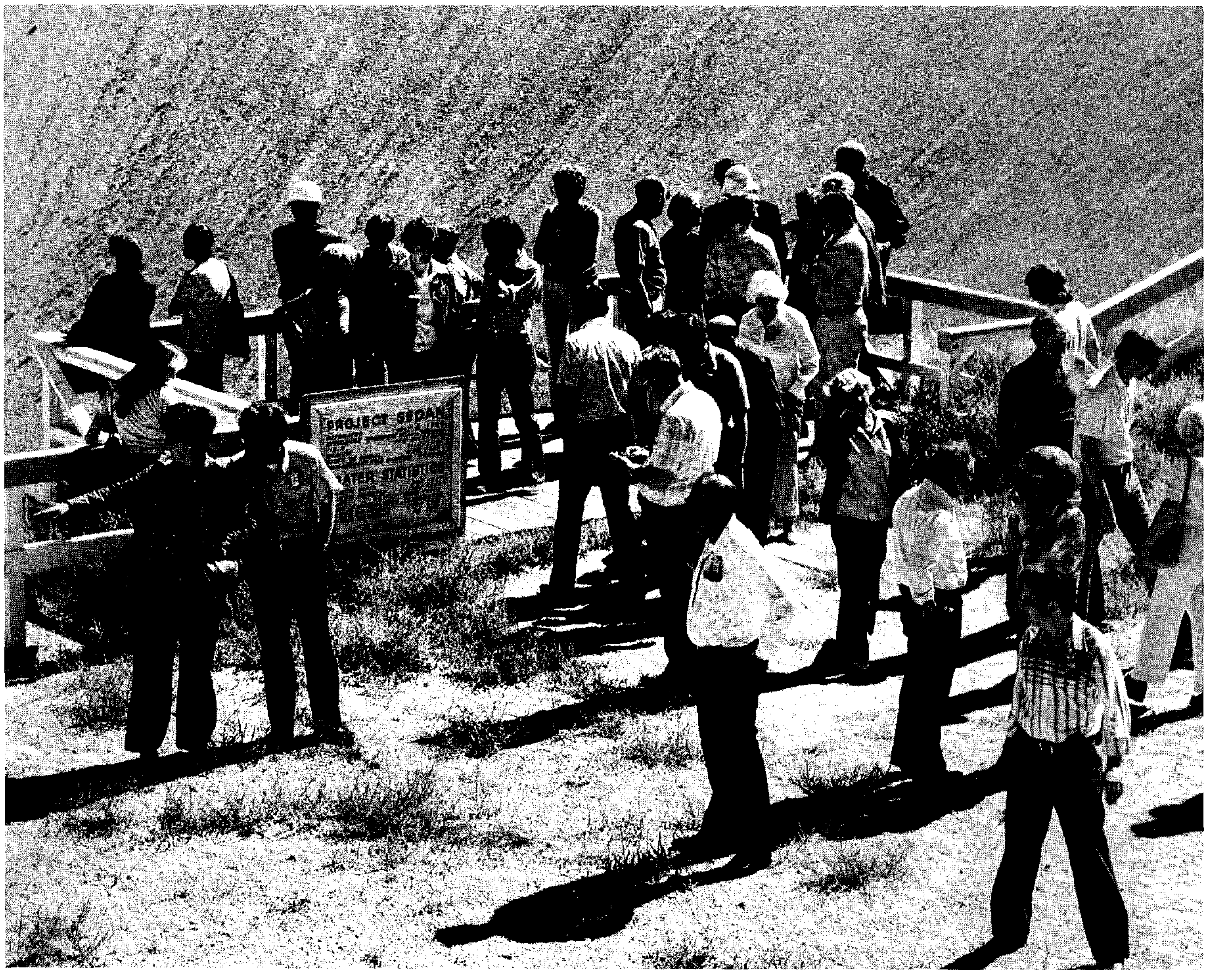
Employment at NTS averages 3,500 with about 1,600 NTS-related personnel working in Las Vegas. The Department of Energy's Nevada Operations Office is charged with management of the test programs. Major programs include nuclear weapons development tests and military effects tests. Plowshare (to investigate the peaceful uses of nuclear explosives) and civil effects tests have been conducted at NTS in the past.

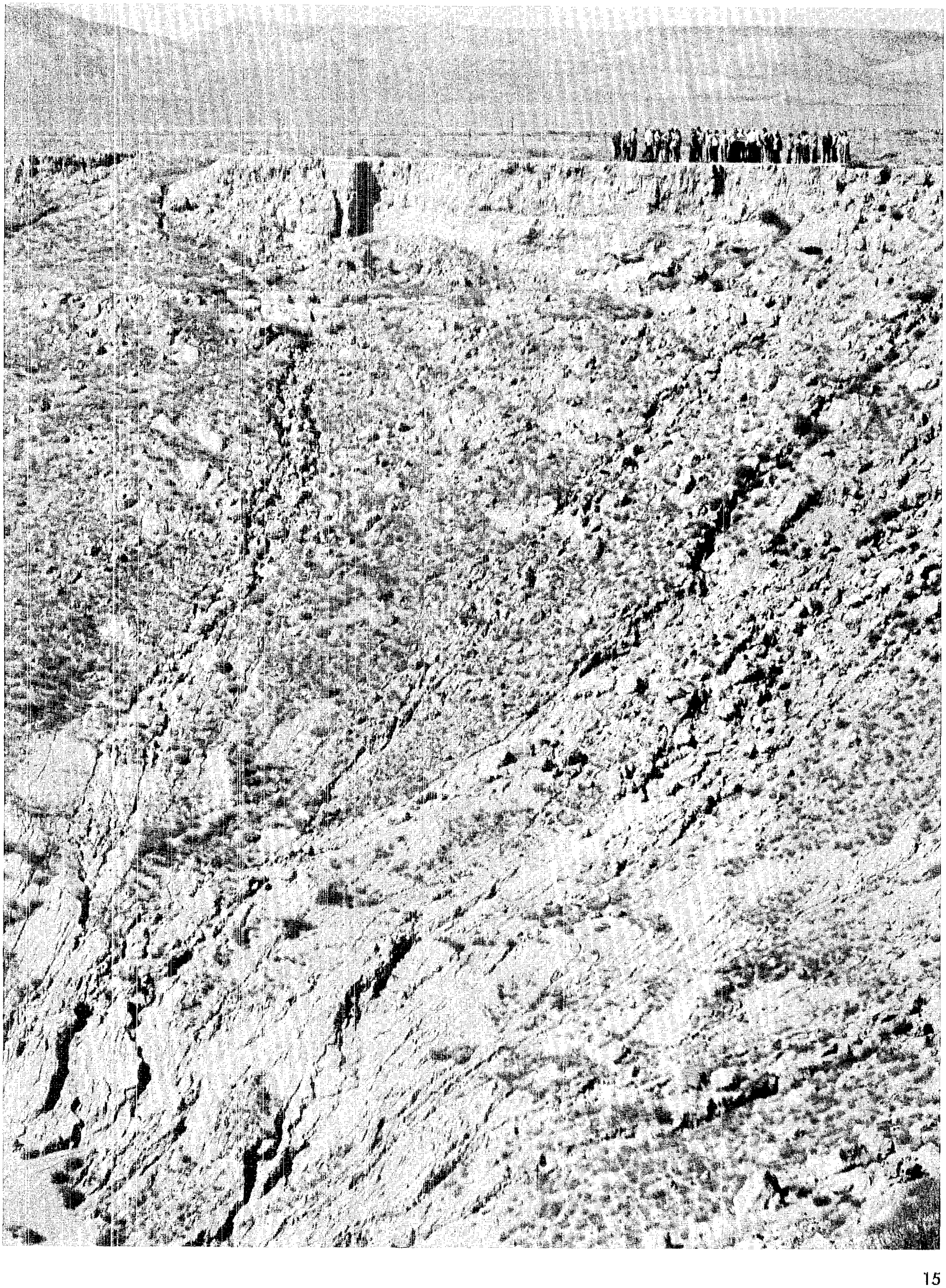
Most nuclear detonations experiments are designed by 2 University of California-operated laboratories—LASL and the Lawrence Livermore Laboratory (L L L). Sandia Laboratories in Albuquerque and Livermore and the Defense Nuclear Agency of the Department of Defense plan and participate in other experiments.

Standing just inside the guard gate at Mercury in J-3's travel office, Beiler commented that while Mercury is not exactly a metropolis, it offers a great deal more in the way of amenities than it did in the early days when atmospheric tests were conducted at NTS.

As proof, we were to tour a typical LASL dormitory. The bus driver wound his way with confidence through narrow thoroughfares marked by conventional street signs with less than conventional names—Knothole Street, Jangle Street, Upshot Avenue.

The immense Sedan crater, in the photo below, is always an interesting stop for visitors to the Nevada Site, and another crater, in the photo at right, dwarfs the group of visitors.





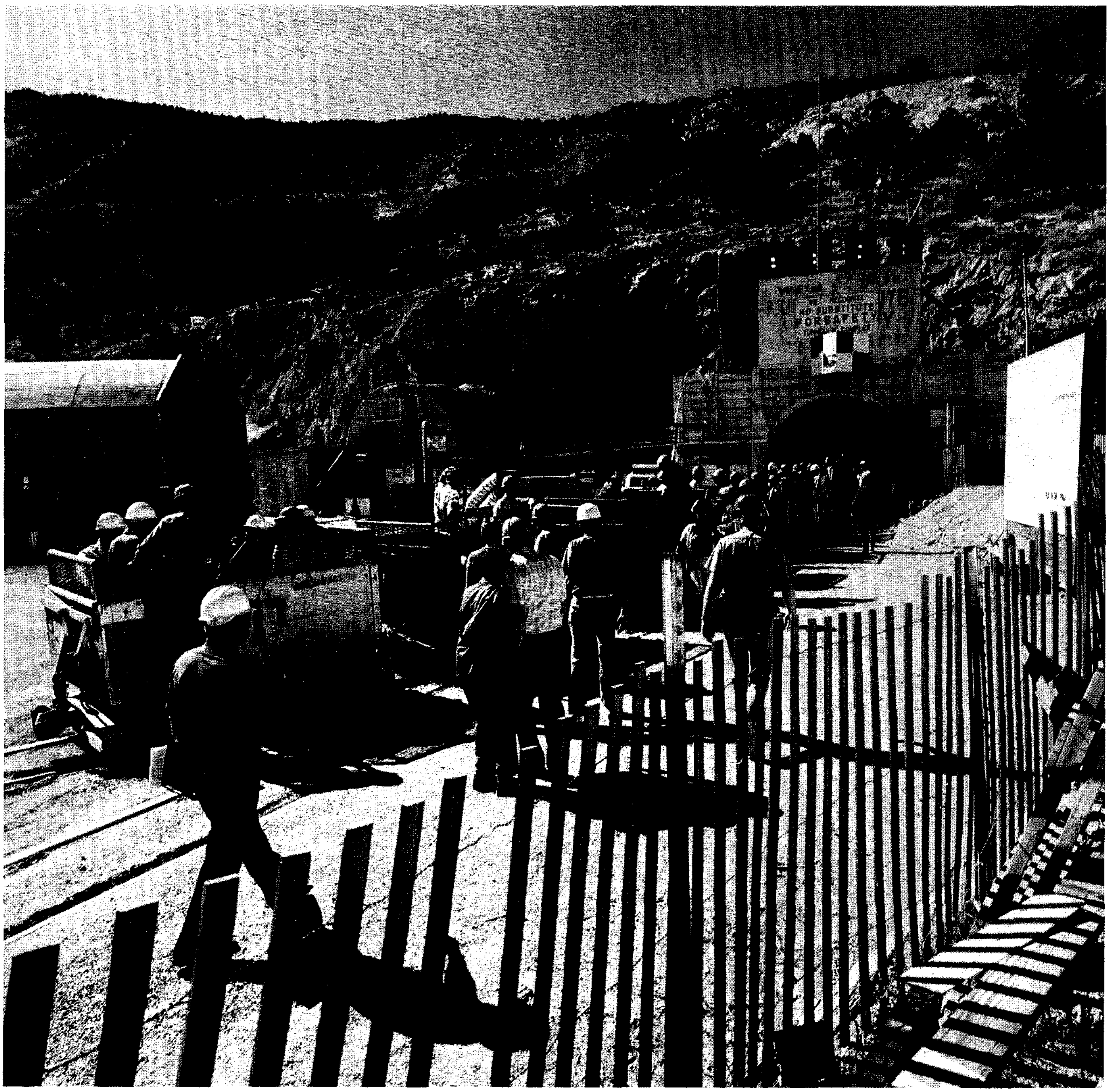
Beiler pointed out a swimming pool, bowling alley, chapel, cafeteria, and steak house; then we stopped at the dorm. It was spartan but spanking clean like a top-of-the-line Motel 6.

A venerable green-baize card table in the dormitory lounge, worthy of an older Las Vegas casino, bore mute evidence to the presence of a pampered feline—an ashtray filled with fresh milk.

About 500 people stay at Mercury, with separate but equal quarters for men and women but no accommodations for families. The site is a boon for many who work here, for NTS is larger than the state of Rhode Island—850,000 acres or about 1,350 square miles—increased in 1956 and again in 1964 from its original 415,000 acres.

The bus sped over the 2-lane highway to CP-1. Control Point 1, as Beiler pointed out, is located in a foreward area of the site on a saddle in Yucca Pass where it com-

Tunnel N at the Test Site is one of the many areas LASL employees and their families can tour each year. The small train carries the group deep into the earth beneath Paiute Mesa.



mands a good view of Frenchman's Flat and Yucca Flat.

Frenchman's Flat, which we were to tour on the way out of NTS, has been used mainly for weapons effects testing in connection with atmospheric tests conducted in the 1950's. Most of the underground tests at NTS have been carried out at Yucca Flat. A huge valley, its geological structure serves science well, being typical of the prevailing geology of the area, which scientists call the Basin and Range Province.

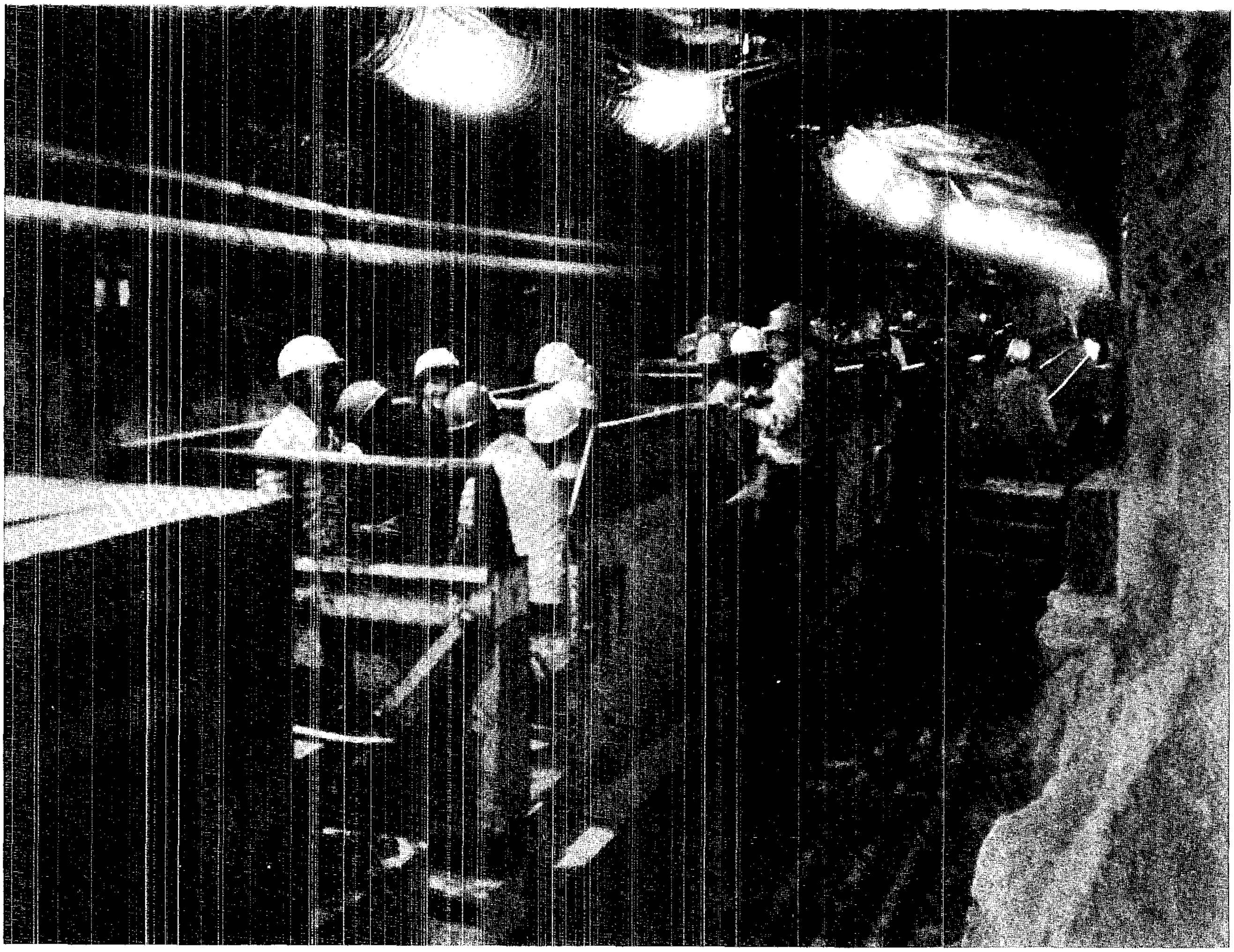
George Hoover, of the DOE's Operations Coordination Center at CP-1, marshaled the 40-odd visitors into the central control room, replete with maps, charts, and 4 closed-circuit television screens.

During a concise 30-minute briefing we learned of the precise planning that goes into each "event" at NTS. The key words were "safety" and "event" in that order. Before each test, the small amphitheater in which we sat would hold 20 or more experts monitoring all aspects of the event, forming the nerve center of a far flung communications network. They include meteorologists, geologists, seismologists, medical radiation specialists and representatives of LASL, LLL, the Environmental Protection Agency, and various other government agencies involved in the event.

Extreme precautions are taken, with an abort of the test possible "as long as there is still human reaction time" according to Hoover. Constant monitoring of NTS and its contiguous land areas extends to checking 4 family milk cows in an off-site area inhabited by 24 persons. Ground and air surveillance are routinely conducted after each test.

A typical, 35-kiloton underground explosion that had been captured on film was aired on the TV screens, as a NASA-sounding voice

The tour group experiences the dark, cool, and damp of N tunnel at the Nevada Test Site.



narrated the countdown . . . 10 . . . 9 . . . 8. First came the spall (shadow), the precursor of a showy cloud of clean surface dust, followed by a flickering picture caused by ground shock waves, then the ultimate, strangely beautiful sight of an enormous underground explosion resulting in a subsidence (crater) 76 feet deep and 576 feet across.

The test would have been "no go" if anything untoward had occurred, Knut Buset, J-8, explained as we toured the LASL control room. Buset provided a rundown on the elaborate monitoring system in the room which keeps tabs on individual events, each of which is controlled by a 2-man code team.

Chances of breaking the code?

"About 10^{-12}," Buset said. Without the code the event is not activated.

Craters such as the one we had just seen born on film dot the flat desert floor of the various test areas at NTS.

One, in LASL Area 3, is the result of an event several years ago. We lined the crater rim, torn between staring at the cavernous hole and at a coyote which circled people and crater, obviously curious about both.

Gordon Jacks, J-DO, explained how such craters are formed:

When the nuclear device is detonated (at depths consistent with test-associated factors), dust disturbed by the shock wave rises above the ground surface over the detonation. Underground the explosion vaporizes, melts, and fractures the adjacent rock. Within minutes, the cavity created by the explosion begins to cool and fracture. The rock ceiling falls in, leaving a chimney, or column, of broken rock and debris. If the collapse reaches the surface (and not all of them do, Jacks said), a crater forms, with the buried mass of rubble effectively sealing in radioactivity from the shot.

Having seen the results of an event, we donned hard hats and drove to a 156-foot-high (12-story) tower where a LASL experiment was being readied.

NTS Is Not Real To The Uninitiated

Jacks and Ron Sharp, J-7, announced that this particular event required a hole 1,350 feet deep, largely uncased, with a 52-inch diameter. More than 234,000 feet of cable will coil from the experiment to a diagnostic area 800 feet distant.

The height of the tower depends on the length of the rack on which the device is supported, Sharp explained. As much as 170,000 pounds of equipment will be painstakingly positioned for the particular shot—no easy task, considering that a perfect line of sight must be maintained from the experiment to the TV camera placed on the rack above to relay pictures of the event in a fraction of a second.

The granddaddy of all craters was next on the tour—Sedan Crater, formed July 6, 1962, during a Plowshare experiment—a 100-kiloton event which lifted 12 million tons of material to form a hole almost a quarter of a mile in diameter, 320 feet deep, with a lip of debris towering up to 100 feet. As an earth-moving experiment, Sedan was an unqualified success.

After a VIP lunch in the remote Area 12 cafeteria, we were briefed on our next "event" by Capt. Alan Bowlsby of the Defense Nuclear Agency. We were about to enter the bowels of the earth through N Tunnel, 1 of half a dozen horizontal bores deep in Rainier Mesa.

Tunnel events give scientists 2 advantages over underground shots. Bowlsby explained: they can piggyback more experiments on the device, and they can simulate atmospheric test conditions.

At the mouth of N Tunnel latent claustrophobics conferred. All eventually boarded a series of small metal cars that were to carry us more than a mile underground behind a noisy diesel engine.

Periodically, as we clanked our way into the cool, damp tunnel, the driver yanked a rag attached to a cable suspended from the arched ceiling. Thus a simple railroad block signal system could keep track of us and make sure that no other cars would attempt to traverse the single line leading in and out of the main bore.

Even the hardiest of us later confessed to minor qualms as we allowed ourselves to reflect that we were one and a quarter miles from the sunny entrance and over a quarter of a mile deep. Those were the statistics given to us at Ground Zero for a planned, 1978 event named Diablo Hawk, our first stop on the underground tour.

Vernon Leu of EG&G Inc., Las Vegas, said Diablo Hawk would carry more than 500 experiments.

Leu let us look down the enormous pipe that would contain Diablo Hawk. Later we backtracked to another "drift," one of the many side bores fanning out like the spokes of a wheel from the main tunnel, to view the other end of the pipe, which is actually a giant vacuum bottle designed to channel radiations from the explosion to the experiments being tested and thus simulate the effects of a nuclear experiment in space.

In a vacuum, a nuclear detonation releases intense heat and radiation, but the devastating shock wave generated in an atmosphere is absent.

Leu described the overlapping safety measures taken to contain tunnel shots as "5 plugs in a chain."

The tube at ground zero is surrounded by rock, dirt, and concrete to contain the force of the explosion. Inside the pipe is a series of gas-driven mechanical doors that close in a few thousandths of a second, like the folding aperture leaves on the shutter of a camera.

Intense bursts of neutrons and radiation speed down the pipe after detonation. The doors snap shut behind them, containing the slower moving vaporized debris. Delicate instruments record the event, then the neutrons and other particles are dissipated in the length of the tube.

Several overburden plugs of concrete are placed along the tunnel as an extra measure of containment, and, finally, a gas-seal door near the junction of the event drift and the main tunnel is ready to barricade any radioactive material that might escape.

There was something tremendously reassuring about the people working in N Tunnel. Their matter-of-fact attention to business, punctuated by curious glances at the tourists, drove home the point that for these people, N Tunnel is a home away from home. One alcove (of many gouged from the tunnel wall) contained a table covered by a white tablecloth with the remains of the day's lunch.

Off in the distance on the way from the tunnel to Frenchman's Flat was Survival City, constructed in the 1950's for a Civil Defense effects test of atmospheric explosions on a typical small town.

Frenchman's Flat itself was almost anticlimatic after the tunnel. But it was here that we saw the remains of effects experiments conducted in atmospheric tests—motel-type structures marred by blast effects, metal pens used to contain animals, and the twisted remains of a metal bridge coming and going nowhere on the flat, blinding white surface of the dry lake bed.

NTS is not quite real to the uninitiated. It is too big, too strange for most outsiders to comprehend. But the need for it is apparent, and it is reassuring to know that if such a place is needed, we have the best, and it is in good hands.

short subjects

LASL researchers were among scientists from throughout the U.S. who gathered on 2 ocean liners off the coast of Mexico in October to record a total solar eclipse. Conducting experiments from the upper deck of the Sitmar liner T.S.S. Fairsea were **Charles Keller**, J-15, **Bobby Strait**, L-10, **Maxwell Sandford**, J-9, **Robert Kennedy**, J-7, and **Darrell Call**, L-10, and **Jack Jekowski** of the Los Alamos branch of EG&G, Inc.

Robert L. Gross, H-4 immunologist, has been named the first recipient of the James L. Tullis Research Award for "superior contributions in clinical research." The award is named for Tullis, professor of medicine at Harvard Medical School and chief of medicine at the Deaconess Hospital in Boston. Gross received his B.A. from Tufts University in 1969 and his M.D. degree from Harvard Medical School in 1974. He came to LASL in the summer of this year.

DEATHS: **Ivan Kenneth Edgett**, WX-3, test laboratory technician; **Jose Andalecio Rendon**, MP-11, mechanical technician; **Joseph Daniel Baca**, ISD-5, routing clerk.

"Hazardous Wastes and Their Disposal" was the subject of the Fifth Life Sciences Symposium at LASL in mid-October. The 3-day meeting was sponsored by several groups within the Department of Energy, and more than 20 papers dealing with all facets of solid waste management were presented. The format of the Life Sciences Symposia is to provide overall coverage of a subject with no overlapping presentations. Papers are by invitation.

John Rowley, G-Division, presented an overview of Russian oil field technology to the delegates of the 52nd annual Technical Conference and Exhibition of the Society of Petroleum Engineers in Denver in October. Rowley was a member of a team of Americans who visited Russia as part of the 1974 U.S.-U.S.S.R. Energy Agreement. Included in the tour were visits to Soviet petroleum engineering colleges, research institutes and facilities, administrative centers, regional research and development centers, and both old and new operating oil fields.

10 years ago in los alamos

Culled from the November, 1967 Files of The Atom and the Los Alamos Monitor by Robert Y. Porton

FUN FIRE!

The fire at the old diesel power plant on Trinity Drive was almost fun for the firemen. There were no injuries; the fire-fighters got in some good practice; and spectators had a diversion. Fire Marshall Albro Rile said the blaze started when a workman —helping dismantle the old plant—cut with a torch into a pipe containing diesel fuel which ignited and quickly spread to other inflammable material in the building. The plant originally provided power for Los Alamos but has been out of use for years.

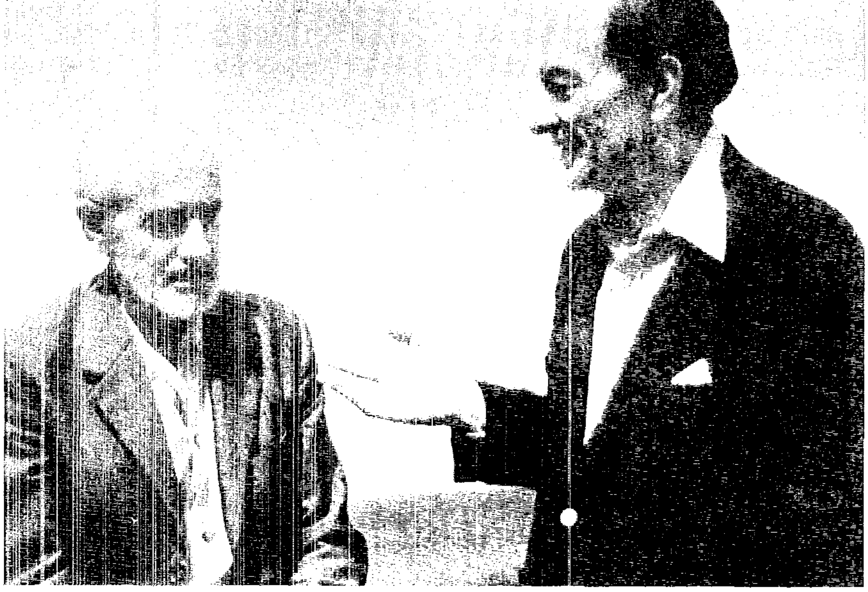
AURORA BOREALIS

Ten Los Alamos Scientific Laboratory staff members are among the scientists who flew from Albuquerque last night in 2 specially instrumented aircraft to study the northern lights over Alaska. During the exercise, data on atmospheric phenomena will be gathered simultaneously by aircraft, satellite, and ground stations. Objective of the team will be to gather data on how the northern lights are created and maintained, and how the energy transfer mechanism is involved in their formation.

NEW DIRECTOR

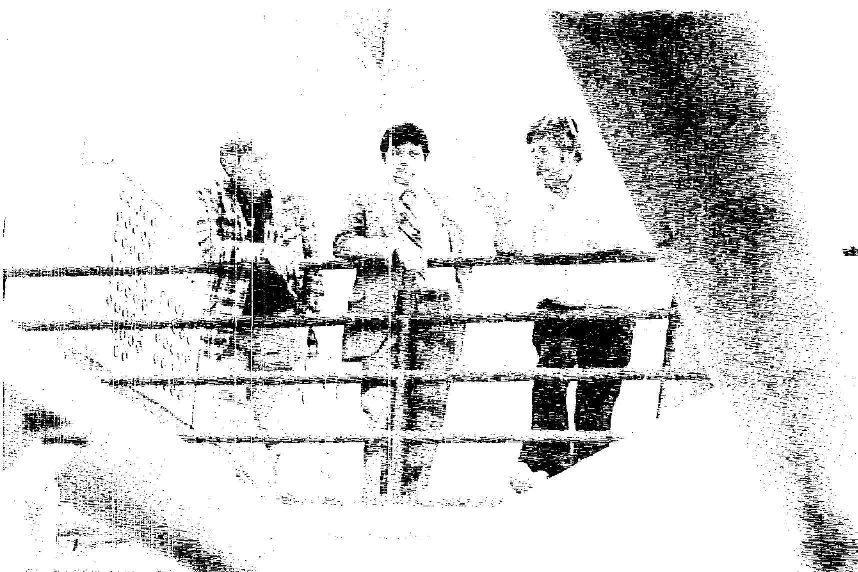
Robert B. Duffield has been named the director of Argonne National Laboratory. President George W. Beadle of the University of Chicago made the announcement last week. Duffield succeeds Albert V. Crewe. The new Argonne director was on the staff of the Los Alamos Scientific Laboratory from 1943 to 1946 and served as a consultant to LASL from 1948 to 1957.

Among Our Guests

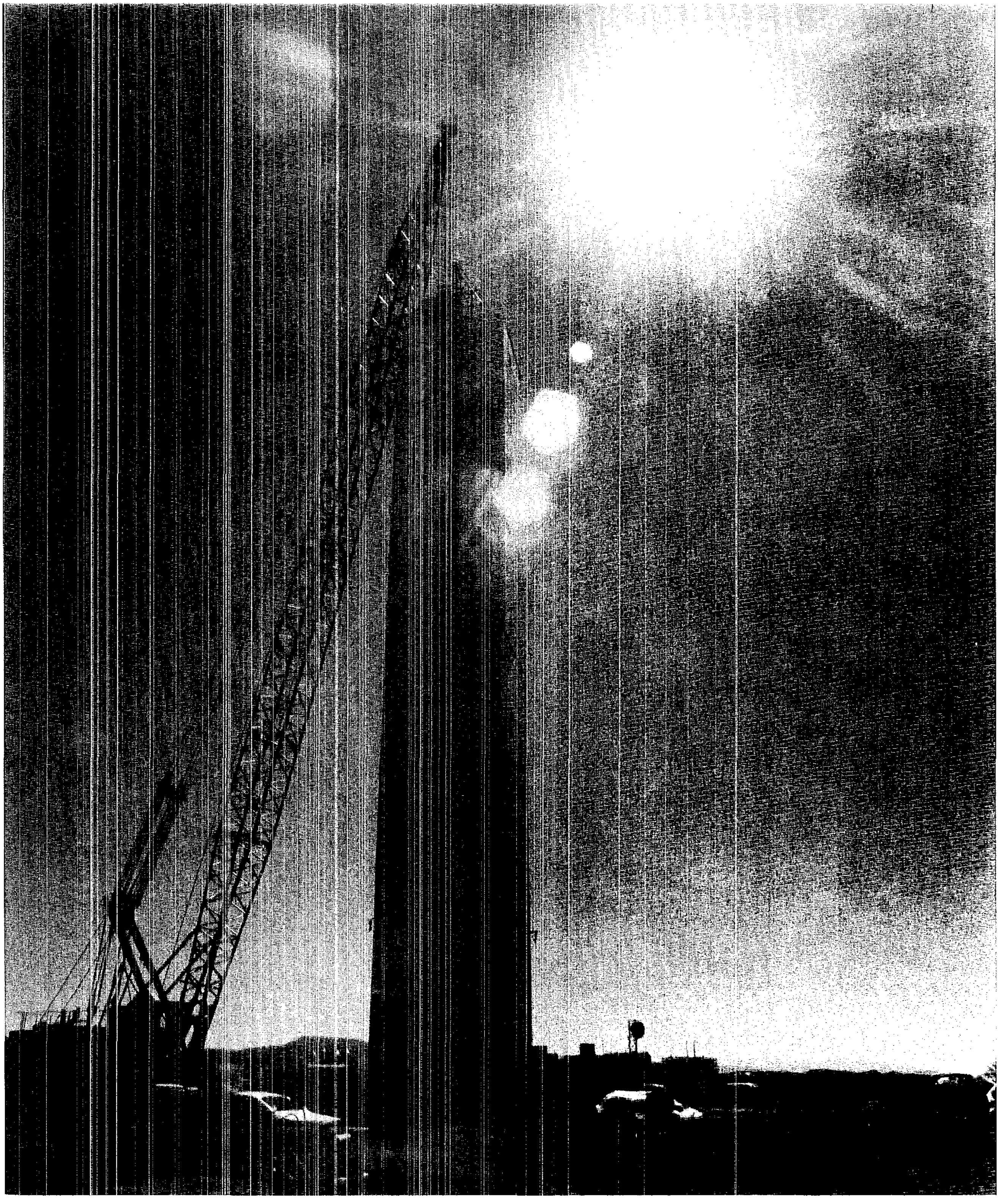


Otto Frisch, left, and Stan Ulam, both renowned scientists, converse during Frisch's recent visit to LASL. Ulam is a retired LASL staff member. Both men have been prominent in physics and mathematics.

H. Hollister Cantus, Director of the Office of Congressional Relations for ERDA (now DOE), spoke at a recent colloquium at LASL. He is responsible for the orderly process of DOE legislation through the Congress and for maintaining good relations between the agency and the Legislative Branch of the government.



U.S. Senator Harrison Schmitt, center, views the solar heating and cooling plant of the National Security and Resources Study Center at LASL. Providing information on the system is Jim Hedstrom, Q-11, as LASL Director Harold Agnew looks on.



This tower, a familiar sight at the Nevada Test Site, holds a rack of experimental and support equipment for underground nuclear tests. For more Bill Jack Rodgers photos of NTS, turn to the article by Barb Mulkin on Page 13.